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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

CONTINUATION SHEET

The amendment filed 6/23/2009 under 37 CFR 1.116 in reply to the final rejection has been entered.

With respect to the rejection of claims 25-28, 30-32, 36-37, 39-41 and 53-57 under 35 U.S.C. 103(a) as being unpatentable over Barbas, III et al (US Patent No. 7,151,201 B2) in view of Filippova et al, Applicant's arguments filed 6/23/2009 have been fully considered but they are not persuasive.

The response asserts that Barbas and Filippova do not establish that is was predictable to modify the recognition region of C3H zinc fingers having the claimed structure to bind to a gene in a plant cell. The response asserts that there is no combination of Barbas and Filippova that establishes that the proteins encoded by the claimed polynucleotides were a predictable use of allegedly known elements. Specifically, the response asserts that Barbas discloses only one C3H finger by reference to Terol, and the protein disclosed by Terol does not meet the structural limitations of the noncanonical zinc finger as claimed. Further, the response asserts that the zinc finger of Terol is not functional in plant cells when the recognition helix is modified (engineered) as claimed. Thus, the response asserts that Barbas does not establish that non-canonical C3H fingers can be predictably modified in their recognition helix region for binding to plant genes. Moreover, the response asserts that Filippova does not teach anything about zinc finger protein that binds to a plant gene or anything about modifying finger 11 of the CTCF protein.

These arguments are not found persuasive. Barbas, III et al teach that any naturally occurring zinc finger protein can be used as a framework (or backbone) to derive a non-naturally

occurring zinc finger with DNA binding specificity determined by alterations in the alpha helix of the zinc finger by using known design rules (e.g., column 10, lines 55-67; column 11, lines 14-35; column 19, lines 28-34 and 57; column 21, lines 8-39; column 22, line 51 to column 25, line 9). Thus, the teachings of Barbas, III et al are not limited to the modification of the C3H finger taught by Terol. Furthermore, the rejection of record is not based upon the C3H protein disclosed by Terol et al. Barbas, III et al teach the use of any zinc finger and define the term "zinc finger" to mean "a polypepitde having nucleic acid, e.g., DNA binding domains that are stabilized by zinc" (e.g., column 10, lines 55-57; column 18, lines 47-49). The zinc finger of Filippova et al meets the definition of "zinc finger" provided by Barbas, III et al. Filippova et al teach that the CTCF protein is a "multivalent" factor that utilizes different combinations of individual zinc fingers to specifically bind to different regulatory DNA sequences (e.g., paragraph bridging pages 2802-2803; Figure 2). Barbas, III et al do not teach that a plant zinc finger backbone must be used to regulate gene expression in plants. Rather, Barbas, III et al suggest the use of mammalian zinc finger proteins as backbones, including ZIF268 (e.g., paragraph bridging columns 19-20). Barbas, III et al teach that the region of the zinc finger protein that mediates specific binding spans positions -1 to +6 of the alpha helix (e.g., column 21, lines 34-39; boxed sequences in Figure 6). Looking at Figure 2 of Filippova et al, one would recognize that the alpha helix of finger 11 contains the sequence of RRNTMAR from -1 to +6. Because Barbas, III et al teach the predictable use of any zinc finger protein capable of binding DNA as a backbone, and Filippova et al teach a noncanonical zinc finger capable of binding DNA, it would have been obvious to use the zinc finger of Filippova et al as a framework in the polynucleotide of Barbas, III et al to encode a zinc finger protein with a DNA binding specificity

determined by alterations in the alpha helix. Applicant's assertion that Filippova et al must teach the binding of CTCF protein to a plant gene is not found persuasive. The binding specificity of the protein encoded by the polynucleotide is determined by the engineering of the recognition region as taught by Barbas, III et al. Furthermore, the claims are not limited to binding of the encoded zinc finger protein to any particular sequence, and Barbas, III teach that the target nucleotide sequence bound by the zinc finger DNA-binding domain may be an endogenous or exogenous sequence (e.g., column 3, lines 23-25). Thus, any target sequence can be inserted into a plant cell in a promoter of a plant gene (e.g., column 3, lines23-43).

The response asserts that the suggested modifications of Filippova et al would destroy the intended function of the protein. Specifically, the response asserts that modifying a protein that binds to the human c-myc promoter to bind a plant gene would destroy the intended function of Filippova's zinc finger.

This argument is not found persuasive. Barbas, III et al teach it is within the skill of the art to use any zinc finger domain as a framework in which to make a zinc finger domain that binds a sequence of GNN, where the sequence is either an endogenous or exogenous plant sequence located in a plant promoter. The function of the zinc finger domain of Filippova et al is to bind DNA. Although the target binding-specificity of the zinc finger domain is altered by the combination of Barbas, III et al and Filippova, the essential function of DNA binding is maintained.

For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

With respect to the rejection of claims 25-28, 30-32, 36, 39-41 and 53-57 under 35 USC 103(a) as being unpatentable over Barbas, III et al (US Patent No. 7,329,728 B1) in view of Filippova et al, Applicant's arguments filed 6/23/2009 have been fully considered but they are not persuasive.

The response asserts that Barbas does not teach a C3H protein of the claimed structure and does not teach that is was predictable to engineer recognition helices in the context of C3H proteins.

This argument is not found persuasive. Filippova et al teach the claimed noncanonical zinc finger structure, which functions as part of a zinc finger protein. Barbas, III et al teach it is within the skill of the art to use any sequence known in the art to function as part of a zinc finger protein (e.g., column 20, lines 51-53).

The response asserts that Filippova et al teach away from modifying the recognition helix of their protein. The response does not cite a specific portion of the Filippova reference that contains the asserted "teaching away."

This argument is not found persuasive, because no teaching away could be found in the teachings of Filippova et al.

The response asserts that modifying the recognition helix region of Filippova as suggested would destroy the intended function of the protein.

This argument is not found persuasive. Barbas, III et al teach that rules for creating zinc fingers of desired specificity are known and can be deduced by methods used by those of skill in the art, and any zinc finger framework sequences known in the art to function as a zinc finger protein can be used (e.g., column 19, lines 28-35; column 20, lines 43-53). The function of the

zinc finger domain of Filippova et al is to bind DNA. Although the target binding-specificity of the zinc finger domain is altered by the combination of Barbas, III et al and Filippova, the essential function of DNA binding is maintained.

For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

With respect to the rejection of claim 37 as being unpatentable over Barbas, III et al (US Patent No. 7,329,728 B1) in view of Filippova et al and further in view of Guyer et al, Applicant's arguments filed 6/23/2009 have been fully considered but they are not persuasive.

The response asserts that Guyer does not discuss non-canonical zinc finger components as claimed.

This argument is not found persuasive, because the combined teachings of Barbas, III et al and Filippova et al teach the noncanonical zinc finger component as claimed.

For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Dunston whose telephone number is 571-272-2916. The examiner can normally be reached on M-F, 9 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Low can be reached at 571-272-0951. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Jennifer Dunston
Examiner
Art Unit 1636

/JD/

/ Christopher S. F. Low /
Supervisory Patent Examiner, Art Unit 1636